

## **ABSTRACT**

A cost-adaptive cache including the ability to dynamically maximize performance in a caching system by preferentially caching data according to the cost of replacing data. The cost adaptive cache includes a partitioned real cache, wherein data is stored in each of the real cache partitions according to its replacement cost. Also, the cost-adaptive cache includes a partitioned phantom cache to provide a directory of information pertaining to blocks of data which do not qualify for inclusion in the real cache. The partitions in the phantom cache correspond to the partitions in the real cache. Moreover, the cost-adaptive cache maximizes performance in a system by preferentially caching data that is more costly to replace. In one embodiment of the system, the cost of replacing a block of data is estimated by the previous cost incurred to fetch that block of data.